What is claimed is:

1. A method for producing (S)-4-halo-3-hydroxybutyric acid ester comprising asymmetrically reducing 4-halo-acetoacetic acid ester or its derivatives with β-ketoacyl-acyl carrier protein reductase constituting Type II fatty acid synthase.

2. The method of claim 1, wherein said β-ketoacyl carrier protein reductase is derived from *Escherihia coli*.

3. The method of claim 1, wherein said β-ketoacyl carrier protein reductase is selected from the group consisting of:

(a) a protein comprising the amino acid sequence of SEQ ID NO: 1;

(b) a protein comprising a modified amino acid sequence of SEQ ID NO: 1 in which one or more amino acid residues are added, deleted, or substituted and capable of asymmetrically reducing 4-haloacetoacetic acid ester or its derivatives to produce (S)-4-halo-3-hydroxybutyric acid ester; and

(c) a protein encoded by DNA hybridizable with the DNA comprising the nucleotide sequence of SEQ ID NO: 2 and capable of asymmetrically reducing 4-haloacetoacetic acid ester or its derivatives to produce (S)-4-halo-3-hydroxybutyric acid ester.

4. The method of claim 1, wherein said β-ketoacyl-acyl carrier protein reductase is derived from microorganisms belonging to the genus *Bacillus*.

5. The method of claim 4, wherein said β-ketoacyl-acyl carrier protein reductase is derived from *Bacillus subtilis*.

6. The method of claim 1, wherein said β-ketoacyl-acyl carrier protein reductase is selected from the group consisting of:

(a) a protein comprising the amino acid sequence of SEQ ID NO: 5;

(b) a protein comprising a modified amino acid sequence of SEQ ID NO: 5 in which one or more amino acid residues are added, deleted,

or substituted and capable of asymmetrically reducing 4-haloacetoacetic acid ester or its derivatives to produce (S)-4-halo-3-hydroxybutyric acid ester; and

(c) a protein encoded by DNA hybridizable with the DNA comprising the nucleotide sequence of SEQ ID NO: 6 and capable of asymmetrically reducing 4-haloacetoacetic acid ester or its derivatives to produce (S)-4-halo-3-hydroxybutyric acid ester.

7. A method for producing (S)-4-halo-3-hydroxybutyric acid ester comprising asymmetrically reducing 4-halo-acetoacetic acid ester or its derivatives with acetoacetyl-CoA reductase constituting the poly-β-hydroxy fatty acid biosynthesis system.

8. A method of claim 7, wherein said acetoacetyl-CoA reductase is derived from microorganisms belonging to the genus *Ralstonia*.

9. The method of claim 8, wherein said acetoacetyl-CoA reductase is derived from *Ralstonia eutropha*.

10. The method of claim 7, wherein said acetoacetyl-CoA reductase is selected from the group consisting of:

(a) a protein comprising the amino acid sequence of SEQ ID NO: 9;

(b) a protein comprising a modified amino acid sequence of SEQ ID NO: 9 in which one or more amino acid residues are added, deleted, or substituted and capable of asymmetrically reducing 4-haloacetoacetic acid ester or its derivatives to produce (S)-4-halo-3-hydroxybutyric acid ester; and

(c) a protein encoded by DNA hybridizable with the DNA comprising the nucleotide sequence of SEQ ID NO: 10 and capable of asymmetrically reducing 4-haloacetoacetic acid ester or its derivatives to produce (S)-4-halo-3-hydroxybutyric acid ester.

11. The method of claim 1, wherein said 4-haloacetoacetic

acid ester is 4-chloroacetoacetic acid ester.

12. The method of claim 7, wherein said 4-haloacetoacetic acid ester is 4-chloroacetoacetic acid ester.

13. The method of claim 1, wherein said 4-haloacetoacetic acid ester is ethyl 4-chloroacetoacetate.

14. The method of claim 7, wherein said 4-haloacetoacetic acid ester is ethyl 4-chloroacetoacetate.

15. The method of claim 1, wherein said method uses a microorganism capable of producing β-ketoacyl-acyl carrier protein reductase constituting Type II fatty acid synthase and an enzyme catalyzing production of NAD(P)H from $NAD(P)^+$.

16. The method of claim 15, wherein said microorganism is a recombinant microorganism into which heterologous or homologous DNA encoding the β-ketoacyl-acyl carrier protein reductase constituting Type II fatty acid synthase and heterologous or homologous DNA encoding an enzyme catalyzing production of NAD(P)H from $NAD(P)^+$, and is capable of expressing both enzymes.

17. The method of claim 16, wherein said microorganism is *Escherihia coli*.

18. The method of any one of claims 15, wherein said enzyme catalyzing production of NAD(P)H from $NAD(P)^+$ is glucose dehydrogenase.

19. The method of claim 7, wherein said method uses a microorganism capable of producing acetoacetyl-CoA reductase constituting the poly-β-hydroxy fatty acid biosynthesis system and an enzyme catalyzing production of NAD(P)H from $NAD(P)^+$.

20. The method of claim 19, wherein said microorganism is a recombinant microorganism into which heterologous or homologous DNA encoding acetoacetyl-CoA reductase constituting the poly-β-

hydroxy fatty acid biosynthesis system and heterologous or homologous DNA encoding an enzyme catalyzing production of NAD(P)H from $NAD(P)^+$ and capable of expressing both enzymes.

21. The method of claim 20, wherein said microorganism is *Escherichia coli*.

22. The method of any one of claims 19, wherein said enzyme catalyzing production of NAD(P)H from $NAD(P)^+$ is glucose dehydrogenase.